

Treatment of Comminuted Long Bone Fractures by Biological Plating

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Abstract

The concept of biological osteosynthesis refers to the conservation of vascularity of the bone during surgical intervention to ensure the continued vitality of the individual fragments and to achieve improved fracture healing. Main principle of biological fixation by minimally invasive locked plate osteosynthesis (MILPO) in long bone fractures is relative stability which is provided by using long plate with limited number of screws. Some biomechanical studies have been reported about this issue. However, clinical studies are still missing. The aims of this prospective study were to evaluate the clinical and radiological results of adult tibia fractures treated by MILPO. A prospective study was conducted with in a period of one and a half year; from Jan. 2015 to May 2016 on 60 patients who presented to emergency wing of orthopaedic depttOf govt. medical college and hospital, Jammu during this period. In our series of 60 patients most of the patients were in the age group of 25-40 years, average age was 35.7 years. RTA accidents accounted for 50% of cases in our series. : Most of the patients had a follow up ranging from 6-15 months. Patients were assessed as per the criterion laid down by S.J Lam at each follow up Most of the patients(70%) had radiological union between 16-25 weeks. Out of 30 patients, 4 patients of fracture humerus were not assessed in this group. 2 pateints with deep wound infection and infected non union did not ambulate and is still under treatment for infection and non union. MIPO technique provides good bone healing and decreases incidence of nonunion and need for bone grafting. The technique of biological plating can be used in fractures where locked nailing cannot be done like vertical slit and markedly comminuted fractures.

Key Words

Minimally invasive Osteosynthesis, Biological Locked plate, Screw

Introduction

Biological fixation by minimally invasive locked plate osteosynthesis (MILPO) has become an option for treating of long bone fractures. It has well-documented

biological advantages compared to conventional plate osteosynthesis including reduced tissue devitalization, avoidance of iatrogenic damage of blood supply around the fracture and early fracture union with decreased wound complications.(1-19). The basic principles of this technique include indirect closed reduction, extraperiosteal

dissection, anatomic alignment and relative stability which permits limited motion at the fracture site and creates secondary bone healing with callus formation (7)

Materials & Methods

A prospective study was conducted with in a period of one and a half year; from Jan. 2015 to May 2016 on 60 patients who presented to emergency wing of orthopaedic depttOf govt. medical college and hospital, Jammu during this period. In our series of 60 patients

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Fig.1-6 Showing operative and postoperative Pictuers of Procedure

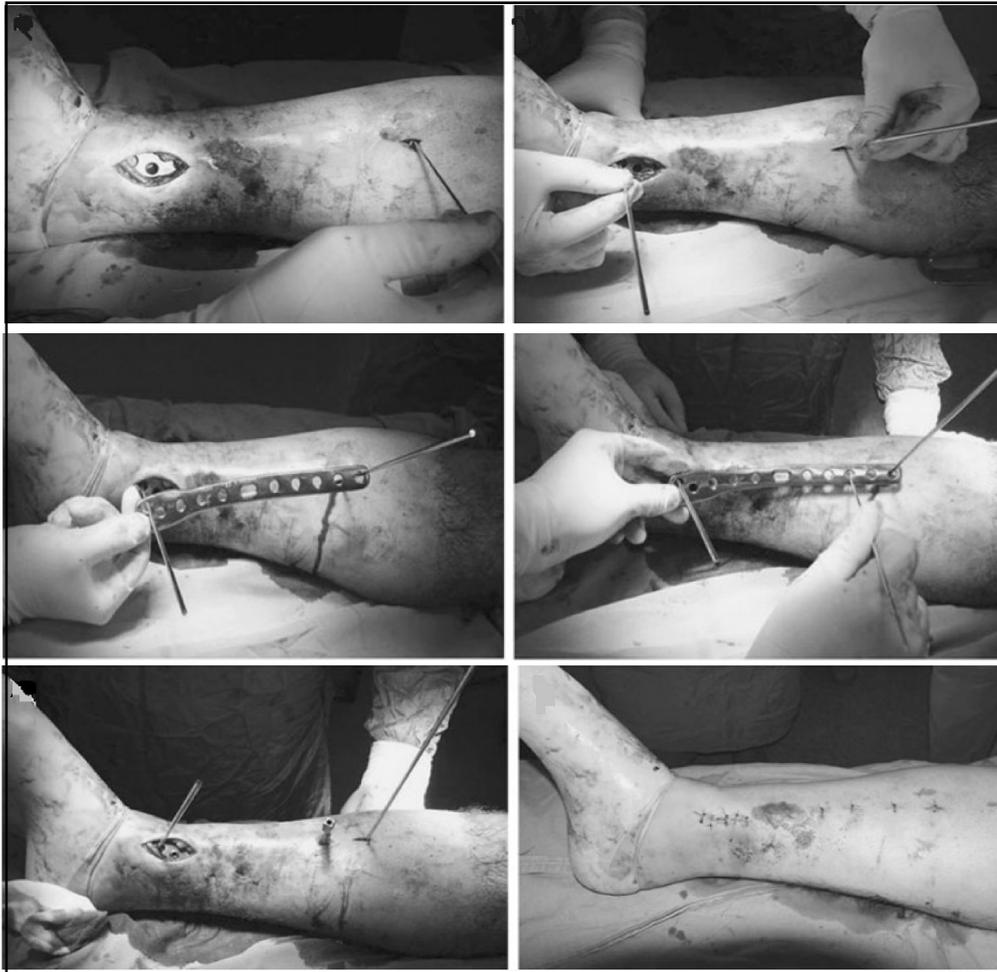


Table.7. Complications

Complications	No of Patients
Superficial Wound	8
Infection	
Deep Wound Infection	4
DVT	2
Implant Failure & Non Union	2
Delayed Union	2
Mortality	0

Table.8. Implants

Implant	No of Patepts
DHS	18
DCS	26
Condylar Blade Plate	4
Dynamic Compression Plate	10
Shermann Plate	2

Table.9. Final Results

Range of Motion	No of Patients	Percentage
ROM 80- 100% , No Pain	42	70%
ROM 60-80% Mild Pain	14	23.3%

management were examined carefully but in a steadfast manner to rule out any head, neck, chest, abdominal and pelvic Injuries.This was followed by primary treatment

in the form of splintage to the affected limb(s) or Skin/ skeletal traction,Analgesics,I.V Fluids,Antibiotics and prophylactic immunisation for tetanus. Routine investigations were done.Operative procedures were carried out at the earliest when patients were fit for Anesthesia.Implants used were properly selected .

Tibia being a superficial bone and could be reached

Fig.7-12 Showing X Ray Pictuers operative and postoperative Pictuers of Procedure



easily through an anteromedial approach without damaging any important structure. For Femur, posterolateral or lateral approach were used which provided access to femoral shaft and trochanter respectively. For humerus posterior approach was used. If Tourniquet was used as in case of tibial fractures, it was released and hemostasis achieved. Thorough wound irrigation was done and wounds closed in layers with a suction drain in place. Patients were put on broad spectrum antibiotics for the shortest possible period depending upon wound condition. Post operative Skiagrams both AP and Lateral views were taken for permanent record. Active static exercises and movements of adjacent joints were started the next day. Sutures removed between 10th - 14th post op day. Follow up of the patients was done at 4 weekly intervals until union occurred. Patients were assessed clinically as well as radiologically. Range of motion of adjacent joints and any

other complications if present were noted. Patients were made ambulatory with non weight bearing crutch walking as soon as the pain was tolerable. Patients were discharged as soon as the stitches were removed with the advice of non weight bearing ambulation and were followed up every 4 weeks in the OPD. Controlled (guarded) weight bearing was allowed gradually over a period of time and full weight bearing allowed

after confirming both clinically as well as radiologically the evidenc of union.

Results

The varioui fact that emerged during the course of this study were ai follows: In our series of 60 patenti most of the patenti were in the age group of 25-40 year, average age was 35.7 years. RTA accidenti accounted for 50% of caiei in our Series.

Follow Up: Most of the patents had a follow up ranging from 6-15 monthi. Patents were assessed as per the criterion laid down by S.J Lam et al follow up (Excellent: ROM 80-100%, No pain ; Good: ROM 60-80%, Mild pain; Moderate: ROM 30-60%, Moderate pain; Poor: ROM <30%, severe pain)

Out of 30 patenti, 4 patents of fracture humerus were not assessed in thii group. 2 pateinti with deep wound infecton and infected non union did not ambulate and sitll under treatment for infecton and non union.

Radiological Union in Weeks: Moit of the patents (70%) had radiological union between 16-25 weeks

Discussion

The technique of biological plating can be used in fractures where locked nailing cannot be done like vertical slit and markedly comminuted fractures . There is rapid fracture consolidation due preserved vascularity. There is fewer incidences of delayed union and non union. There

is decreased need for bone grafting. There is less incidence of exposure due to limited exposure and less chances of refracture. There is no chance of vascular complication by carefully inserting the plate submuscularly through limited incisions. The method is less time consuming and cost effective. The usefulness of Biological Plating has been established in the present study. Hence, the procedure can be used safely in “Comminuted fractures of long bones “ with proper indications.

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